# Application of modified fulvic acid in preparation of antitumor drugs


## Abstract

The invention discloses application of modified fulvic acid in preparation of antitumor drugs. A preparation method of the modified fulvic acid comprises the following steps: (1) directionally degrading a raw material containing fulvic acid or fulvic acid in water through HNO3 and H2SO4 to obtain a fulvic acid degradation product; and (2) under a microwave condition, carrying out reaction between the fulvic acid degradation product obtained from the step (1) and kojic acid or extract containing kojic acid to obtain the modified fulvic acid. The application disclosed by the invention, compared to the existing treatment medicines, has the advantages in following three aspects: 1) the modified fulvic acid can be extracted from peat resource, thus realizing full use of resource and protecting environment; 2) the prepared antitumor drugs are rich in raw medicine resource, and although being same with the existing treatment medicines in curative effect, are higher in cost performance; and 3) the antitumor drugs, compared to other Western medicines, are good in curative effect and less in side reaction. The modified fulvic acid preparation disclosed by the invention is good in both social and economic benefits.



CN103720716A

China

Download PDF Find Prior Art Similar

**Other languages:** Chinese

**Inventor:** 吕伟东, 陈为, 刘强

**Current Assignee :** GUANGZHOU DONGSONG ENERGY GROUP Co Ltd

**Worldwide applications**

2013 CN

**Application CN201310711250.1A events**

| | |
|---|---|
| **2013-12-20** | Application filed by GUANGZHOU DONGSONG ENERGY GROUP Co Ltd |
| **2013-12-20** | Priority to CN201310711250.1A |
| **2014-04-16** | Publication of CN103720716A |
| **Status** | Pending |

**Info:** Patent citations (1), Non-patent citations (3), Cited by (2), Legal events, Similar documents, Priority and Related Applications

**External links:** Espacenet, Global Dossier, Discuss


## Claims (9)

Hide Dependent

1. the application of modification yellow humic acid in preparing antitumor drug, the preparation method of described modification yellow humic acid comprises the following steps: (1) will be containing raw material or the yellow humic acid of yellow humic acid, in water through $HNO_3$and $H_2SO_4$directed degraded, makes yellow humic acid degradation products; (2), under microwave condition, the yellow humic acid degradation products that step (1) is made, reacts with kojic acid or containing the extract of kojic acid, obtains.

2. modification yellow humic acid claimed in claim 1 is being prepared antitumor and is being alleviated the application in the medicine of cyclophosphamide damage immune organ.

3. the application of modification yellow humic acid according to claim 1 and 2 in preparing antitumor drug, is characterized in that: the dosage form of described medicament is peroral dosage form.

4. the application of modification yellow humic acid according to claim 1 and 2 in preparing antitumor drug, is characterized in that: in described step (1), the raw material that contains yellow humic acid is peat, brown coal or weathered coal containing yellow humic acid.

5. the application of modification yellow humic acid according to claim 1 and 2 in preparing antitumor drug, is characterized in that: in described step (1), and $HNO_3$and $H_2SO_4$mass ratio be 5:1 ~ 3:1.

6. the application of modification yellow humic acid according to claim 1 and 2 in preparing antitumor drug, is characterized in that: in described step (1), and degradation agent $HNO_3$and $H_2SO_4$consumption be 20 ~ 30%, percentage ratio is the mass concentration percentage ratio of degradation agent in water.

7. the application of modification yellow humic acid according to claim 1 and 2 in preparing antitumor drug, it is characterized in that: in described step (1), directed degraded is carried out under Ultrasonic Conditions, and ultrasonic frequency is 100 ~ 200KHz, temperature is 90-120 ℃, 100 ~ 140 minutes time.

8. the application of modification yellow humic acid according to claim 1 and 2 in preparing antitumor drug, is characterized in that: in described step (2), described microwave condition is microwave frequency 2450Hz, under microwave power 450 ~ 550W, and reaction 25 ~ 35min.

9. the application of modification yellow humic acid according to claim 1 and 2 in preparing antitumor drug, is characterized in that: in described step (2), and yellow humic acid degradation products and kojic acid or be 1:1 ~ 1:2 containing the mol ratio of the extract of kojic acid.

## Description

The application of modification yellow humic acid in preparing antitumor drug

Technical field

The invention belongs to drug world, particularly the medicinal usage of the modification yellow humic acid in peat extract.

Background technology

Peat is a kind of process formed atmospheric swamp ground product in several thousand, is the coal that degree of coalification is minimum, is also the most original state of humic coal series.Peat is piled up formation in peat bog, under the pressure and further fungi degradation condition of overlying sediments thing, through compression and dehydration, become firmer later, become brown coal, while continuing to be again subject to subsurface temperature and pressure-acting, through incoalation, form bituminous coal or anthracite.Organic matter in peat is mainly cellulose, hemicellulose, lignin, humic acid, bituminous material etc.In peat, content of humic acid is often that 10 ~ 30%, Gao Zheke reaches more than 70%.Peat is of many uses, can be used for agricultural, as organic fertilizer with grow seedlings and the soil matrix of flower cultivating, also can be used for industry, as fuel power generation function, chemical industry (therefrom extracting plurality of raw materials), wine brewing, medicine, potting and construction material etc.Peat and main effective ingredient humic acid substance thereof, have multiple use at field of medicaments, has part report to have convergence, antiinflammatory, pain relieving, removing the necrotic tissue and promoting granulation effect for gastroenteropathy, arthritis etc., and dermatosis, eczema etc. is had to certain curative effect.

Chinese patent (patent No. 200810205110.6) " a kind of method of modifying of yellow humic acid and products obtained therefrom and the application in preparation raising immunity or control HIV medicine thereof " discloses a kind of method of modifying of yellow humic acid, it comprises the steps: that (1) is by raw material or yellow humic acid containing yellow humic acid, in water, under the effect of degradation agent, through orientation degraded, make yellow humic acid degradation products; Described degradation agent is $HNO_3$, $HNO_3$and $H_2SO_4$, or acetic acid and $H_2O_2$; (2), under microwave condition, the yellow humic acid degradation products that step (1) is made, reacts with kojic acid or containing the extract of kojic acid, makes yellow humic acid modifier of the present invention.This invention also relates to the yellow humic acid modifier being made by said method and improves the application in the medicine of immunity or the medicine of control HIV in preparation.The yellow humic acid modifier tool of this invention immunity that increases significantly, especially improve the effect of HIV patient's immunity, and toxic and side effects is little, and drug resistance is little, and targeting is clear and definite, and preparation method is simple, and cost is low.

Tumor is a class commonly encountered diseases, the frequently-occurring disease that harm humans health is the most serious.Due to factors such as life stress increases under increasing environmental pollution, nutrient imbalance, aged tendency of population and keen competition, the sickness rate of whole world malignant tumor is more and more higher at present.At present, China's tumor incidence is about 2,00/,100,000, and the annual new cases of cancer of China approximately more than 2,200,000, is being controlled patient more than 6,000,000 every year, and medical expense, more than 1,500 hundred million, is died from every year cancer number and surpassed 1,600,000.

Modern medicine mainly comprises the 3 large classes such as operative treatment, radiotherapy, chemotherapy to the treatment means of tumor.But above-mentioned therapy inevitably can be brought untoward reaction to patient when treatment tumor, affects patient's life quality.Now, from the treatment pattern of " take disease as core, to greatest extent killing tumor cells ", to take, " patient is core to the evaluation theory of clinical efficacy, seeks the preferably hommization of quality of life " treatment Mode change.This theory and theory of Chinese medical science characteristic i.e. " organic conception, determination for the treatment of based on pathogenesis obtained through differentiation of symptoms and signs, YIN and YANG balance regulating ", is consistent.

The anti-curing oncoma of the traditional Chinese medical science has the history of several thousand, tumor belongs to " gathering " category in the traditional Chinese medical science, successive dynasties, all there was discussion in all families, as < < difficulty in 55 difficult > > " therefore long-pending person, the five internal organs are given birth to; Poly-person, six internal organs become.Also long-pending person, also, its normal place that started, its disease is not from its portion for cloudy gas ", the traditional Chinese medical science thinks, and tumor is in healthy energy virtual loss, evil poison, to invade cohesion to form and take in early days the domination of pathogen as main, and middle and advanced stage patient also exists the obvious virtual image.The generation of its disease is many by the pent-up of feelings will, injury due to diet, and cold-evil attacks outward and body is empty after being ill, or jaundice, malaria etc. are prolonged more not so that liver spleen is not impaired, internal organs are become estranged, mechanism of qi block, stop in blood stasis or sluggish the forming of double phlegm-damp gathered.

From the 1950's, China is theoretical to the etiology and pathogenesis of tumor, traditional Chinese medical science ancient times for cancer, ancient times secret recipe and folk remedy carry out system finishing and research, propose the traditional Chinese medical science, swollen lame basic skills and the thinking of therapy of combining Chinese and Western medicine, and started to pay attention to the anticancer research under the instruction of Chinese Medicine theory such as determination for the treatment of based on pathogenesis obtained through differentiation of symptoms and signs rule.Traditional Chinese medical science scholar has verified the original effect of Chinese medicine oncotherapy from multi-level, multi-angle, the clear and definite effect of Chinese medicine in combined therapy of tumour, and in conjunction with the latest developments of modern medicine, to tumor neovasculature intervention and to aspects such as Radiotherapy chemotherapy attenuation enhanced sensitivities, carried out a series of research adopting Chinese medicine to improve Quality of Life of Tumor Patients, prevention of recurrence transfer, artitumor multi-medicine-resistant, Chinese medicine.Research discovery treatment by Chinese herbs tumor is being stablized tumor body, regulates body function, increases immunocompetence, improves clinical symptoms, alleviates toxic and side effects of chemoradiotherapy, and extending band tumor life span aspect has unique curative effect.From natural product, find that new anti-tumor Chinese medicine has good economic benefit and social benefit.

Summary of the invention

The object of this invention is to provide the application of modification yellow humic acid in preparing antitumor drug.

Technical scheme of the present invention is achieved in that the application of modification yellow humic acid in preparing antitumor drug, and the preparation method of described modification yellow humic acid comprises the following steps: (1) will be containing raw material or the yellow humic acid of yellow humic acid, in water through $HNO_3$and $H_2SO_4$directed degraded, makes yellow humic acid degradation products; (2), under microwave condition, the yellow humic acid degradation products that step (1) is made, reacts with kojic acid or containing the extract of kojic acid, obtains.

Described modification yellow humic acid is being prepared antitumor and is being alleviated the application in the medicine of cyclophosphamide damage immune organ.

The dosage form of described medicament is peroral dosage form.

In described step (1), the raw material that contains yellow humic acid is peat, brown coal or weathered coal containing yellow humic acid.

In described step (1), $HNO_3$and $H_2SO_4$mass ratio be 5:1 ~ 3:1.

In described step (1), degradation agent $HNO_3$and $H_2SO_4$consumption be 20 ~ 30%, percentage ratio is the mass concentration percentage ratio of degradation agent in water.

In described step (1), directed degraded is carried out under Ultrasonic Conditions, and ultrasonic frequency is 100 ~ 200KHz, and temperature is 90-120 ℃, 100 ~ 140 minutes time.

In described step (2), described microwave condition is microwave frequency 2450Hz, under microwave power 450 ~ 550W, and reaction 25 ~ 35min.

In described step (2), yellow humic acid degradation products and kojic acid or be 1:1 ~ 1:2 containing the mol ratio of the extract of kojic acid.

The present invention compares with existing medicine, has the advantage of three aspects: 1) can utilize peat Resource Access modification yellow humic acid, take full advantage of resource, protect environment; 2) material medicine aboundresources, to compare curative effect identical with existing medicine, but cost performance is higher; 3) compare good effect but untoward reaction is few with other Western medicine.Modification yellow humic acid preparation of the present invention will have good Social benefit and economic benefit.

The specific embodiment

The present invention is the application of modification yellow humic acid in preparing antitumor drug, described modification yellow humic acid is the product that the open preparation method of Chinese patent 200810205110.6 makes, concrete preparation method is: (1) will be containing raw material or the yellow humic acid of yellow humic acid, in water through $HNO_3$and $H_2SO_4$directed degraded, makes yellow humic acid degradation products; (2), under microwave condition, the yellow humic acid degradation products that step (1) is made, reacts with kojic acid or containing the extract of kojic acid, obtains.Preferably, in step (1), the raw material that contains yellow humic acid is peat, brown coal or weathered coal containing yellow humic acid.$HNO_3$and $H_2SO_4$mass ratio be 5:1 ~ 3:1.Degradation agent $HNO_3$and $H_2SO_4$consumption be 20 ~ 30%, percentage ratio is the mass concentration percentage ratio of degradation agent in water.Directed degraded is carried out under Ultrasonic Conditions, and ultrasonic frequency is 100 ~ 200KHz, and temperature is 90-120 ℃, 100 ~ 140 minutes time.In step (2), described microwave condition is microwave frequency 2450Hz, under microwave power 450 ~ 550W, and reaction 25 ~ 35min.Yellow humic acid degradation products and kojic acid or be 1:1 ~ 1:2 containing the mol ratio of the extract of kojic acid.

Modification yellow humic acid of the present invention is the active component of peat, according to conventional preparation process, can take modification yellow humic acid as main active, add the excipient substances such as conventional excipient, flavoring agent, antiseptic, lubricant, wetting agent, adhesive, thickening agent, solubilizing agent, make any peroral dosage form that is suitable for using clinically, as capsule, tablet, electuary etc.General, the oral modification yellow humic acid dosage of preparation is 4.5 grams of every days, day takes 3 times, each serving with 1.5 grams.

Because the present invention discloses the application of modification yellow humic acid in preparing antitumor drug first, especially modification yellow humic acid is being prepared antitumor and is being alleviated the application in the medicine of cyclophosphamide damage immune organ.By modification yellow humic acid separately or coordinates and make medicament with other active constituent or adjuvant, need only this medicament and be used for the treatment of tumor, no matter with which kind of administering mode, all belong to protection scope of the present invention.

The present invention has confirmed that first modification yellow humic acid has tumor suppression, share with cyclophosphamide can Effect enhancing and toxicity reducing (alleviating its damage to immune organ), has increased mouse peripheral blood leukocyte count, and mice 60Co x ray irradiation x is caused to bone marrow injury model good radiotherapy protective effect.Below in conjunction with specific embodiment, the present invention is described further, but the present invention is not limited to this specific examples.

Embodiment 1

By 100g natural peat yellow humic acid, containing degradation agent $HNO_3$and $H_2SO_4$aqueous solution (100ml, degradation agent total concentration 25wt%, $HNO_3$and $H_2SO_4$mass ratio be 4:1) in, at 110 ℃ of temperature, under the ultrasound wave of 150KHz, directed degradation reaction 120min, obtains mean molecule quantity and is 140 yellow humic acid degradation products.By 1mol yellow humic acid degradation products and kojic acid extract (containing 1.5mo1 kojic acid) at microwave frequency 2450Hz, under microwave power 500W, reaction 30min, then through medical activated carbon absorption roguing, make the yellow humic acid modifier powder of the present embodiment.

The preparation of embodiment 2 modification yellow humic acid capsules

Preparation method: modification yellow humic acid, starch and L-HPC are mixed to mix homogeneously; Add starch slurry soft material processed in right amount, with 16 orders, granulate, be dried and granulate, add micropowder silica gel, magnesium stearate mix homogeneously, make 1000.

Oral dose is for day taking 3 times, each serving with 3.

The preparation of embodiment 3 modification yellow humic acid tablets

Formula: the modification yellow humic acid 450g of embodiment 1 gained

Magnesium stearate 5g

DEXTRIN g

Preparation method: get principal agent modification yellow humic acid and dextrin and fully mix rear mistake 60 mesh sieves, make soft material, 24 mesh sieves are granulated, and dry, granulate, adds magnesium stearate fully to mix before tabletting, measure granule content qualified after, tabletting and get final product, makes 1000.

Oral dose is for day taking 3 times, each serving with 3.

The antitumor action research of experimental example 1 modification yellow humic acid

1. experiment material

1.1 laboratory animal SPF level KM mices, male, body weight 18 ~ 22g, 72, mice sarcoma cell strain S180.

1.2 Experimental agents modification yellow humic acids (FA).Precision takes the modification yellow humic acid powder 2.32g of embodiment 1 gained respectively, 4.64g, and 9.28g, dissolves, and is settled to 100ml, as the basic, normal, high concentration liquid of FA, freezing standby respectively.

1.3 reagent Cyclophosphamide for injection (CTX), batch number: 12040925, Hengrui Medicine Co., Ltd., Jiangsu Prov..

1.4 Instrumental Analysis balances; Electronic balance.

2. experimental technique

The foundation of 2.1 animal models for tumour

Get the Sarcoma180 ascites tumor mice that inoculates 7d, dislocation is put to death.Under aseptic condition, extract intraperitoneal oncocyte, and with normal saline washing 3 times, the centrifugal 3min of 2500r/min, abandon supernatant, with physiological saline solution, adjusting oncocyte concentration is 1.0 * 107/mL, is inoculated in every mice right fore armpit subcutaneous, and inoculum concentration is 0.2ml/.

2.2FA and CTX share the impact on mouse tumor growth

Mice is divided into 6 groups at random.Be dosage group, CTX+FA high dose group in model group, cyclophosphamide (CTX) group, the middle dosage group of oral modification yellow humic acid (FA), CTX+FA low dose group, CTX+FA.Model group is with distilled water gavage, and dosage is 25ml/kg; Cyclophosphamide (CTX) group is with CTX normal saline solution lumbar injection, and dosage is 20mg/kg; In oral FA, dosage group is with concentration liquid gavage in FA, and dosage is 1.1g/kg; When dosage group, CTX+FA high dose group are all with 20mg/kg intraperitoneal injection of cyclophosphamide in CTX+FA low dose group, CTX+FA, carry out gavage respectively with the basic, normal, high concentration liquid of FA, dosage is respectively 0.55g/kg, 1.1g/kg, 2.2g/kg.Successive administration 7 days, after last administration, tumor-bearing mice is put to death in 24h dislocation, gets tumor and claims quality, by CTX treatment group, use FA group with adding more merely,

singly take the difference of tumor-inhibiting action between FA, observe the potentiation of FA to CTX tumor suppression, and calculate the tumour inhibiting rate that each is organized, computing formula is as follows:

2.3FA and the impact of CTX coupling on mouse immune organ

The foundation of mouse tumor model, grouping, administration are all with 3.2.After last administration, tumor-bearing mice is put to death in 24h dislocation, gets spleen, thymus minute another name quality, with following formula, calculates respectively index and spleen index and thymus index, observes the Attenuation of FA.

2.4 statistical method

This tests all mean ± standard deviations for result represent.Adopt SPSS13.0 statistical software, by one factor analysis of variance method (One-Way ANOVA), compare group difference, between group, significance relatively adopts LSD method between two, usings 0.05 or 0.01 as significant difference sign.

3. experimental result

3.1FA and CTX share the impact on mouse tumor growth

Compare with model group (in Table 1), in cyclophosphamide (CTX) group, oral modification yellow humic acid (FA), in dosage group, CTX+FA low dose group, CTX+FA, dosage group, CTX+FA high dose group all have obvious tumor-inhibiting action.But compare with cyclophosphamide (CTX) group, it is general that CTX applies separately tumor killing effect, and CTX+FA low dose group, CTX+FA high dose group can improve its tumour inhibiting rate to a certain extent.

Table 1FA and CTX share the tumor-inhibiting action (X ± s) to tumor-bearing mice

Compare with model group, $^{*}p<0.05$, $^{*}p<0.01$; Compare #P<0.05 with CTX group

3.2FA and CTX share the impact on tumor-bearing mice immune organ

3.2.1 the impact on tumor-bearing mice index and spleen index

Compare with model group (in Table 2), the index and spleen index of each administration group all has decline in various degree.Wherein the mouse spleen index decreased of dosage group, CTX+FA high dose group especially obviously (P<0.01) in cyclophosphamide (CTX) group, CTX+FA low dose group, CTX+FA, illustrates that cyclophosphamide has the effect of the spleen atrophy that causes significantly tumor-bearing mice.And compare with the index and spleen index of CTX group, in CTX+FA low dose group, CTX+FA, dosage group, CTX+FA high dose group have had the raising (P<0.05) of significance, in oral modification yellow humic acid (FA), the index and spleen index of dosage group differs more obvious (P<0.01), illustrates that FA can improve the atrophy of the spleen being caused by CTX.

3.2.2 the impact on tumor-bearing mice thymus index

Compare with model group (in Table 2), the thymus index of each administration group all has decline in various degree, illustrates that cyclophosphamide has the effect of the atrophy of thymus gland that causes significantly tumor-bearing mice.And compare with the index and spleen index of CTX group, CTX+FA high dose group has the increase (P<0.05) of significance, illustrates that FA can improve the atrophy of thymus gland being caused by CTX.

Table 2FA and CTX share the effect of tumor-bearing mice immune organ (X ± s)

Compare with model group, $^{*}p<0.05$, $^{*}p<0.01$; Compare #p<0.05, ##p<0.01 with CTX group

4. conclusion

Cyclophosphamide has broad spectrum anticancer effect, be that the most frequently used alkylating agent for the treatment of malignant tumor represents medicine, but the main toxic and side effects of this medicine is an outstanding problem in clinical use always.Illustrated as experiment, this medicine can cause spleen, and serious atrophy appears in the immune organs such as thymus.Therefore in oncotherapy, how reducing the toxic and side effects of radiotherapy, chemotherapy, the situation of improving tumour patient has become the key for the treatment of tumor.Found that, modification yellow humic acid has stronger tumor-inhibiting action, share with cyclophosphamide, modification yellow humic acid can improve animal spleen and the atrophy of thymus gland being caused by cyclophosphamide, and prompting modification yellow humic acid can significantly reduce the damage to body immune system of cancer therapy drug.

Experimental example 2 modification yellow humic acids cause the research of bone marrow injury model Attenuation to mice 60Co x ray irradiation x

1. experiment material

1.1 animal SPF level KM mices, male, body weight 18 ~ 22g, 72 (production licence number: SCXK (Guangdong) 2008-0002; Control 20 ~ 25 ℃ of receptacle room temperatures, humidity 40 ~ 70%, freely drinks water, and ingests.

1.2 drug modified yellow humic acids (FA).Precision takes the modification yellow humic acid powder 2.32g of embodiment 1 gained respectively, 4.64g, and 9.28g, dissolves, and is settled to 100ml, and as the basic, normal, high concentration liquid of FA, cold preservation is standby respectively.

1.3 reagent DIYU SHENGBAI PIAN (the accurate word Z20026497 of traditional Chinese medicines; Batch number: 130504)

1.4 instrument electronic balances; Microscope

2. experimental technique

60 C57BL/6 mices are chosen in 2.1 modelings at random, through 60Co ray, carry out the disposable irradiation of whole body, and exposure dose is 3.0Gy, 4min.

2.2 groupings are divided into blank group by non-irradiated 12, and the mice of irradiation is divided into 5 groups at random, is respectively model group, positive controls, the basic, normal, high dosage group of modification yellow humic acid.

2.3 the blank group of administration is filled with distilled water with model group, DIYU SHENGBAI PIAN gastric infusion, and dosage is 0.15g/kg; The basic, normal, high dosage group of modification yellow humic acid gastric infusion, dosage is respectively: 0.55g/kg, 1.1g/kg, 2.2g/kg.Each organizes mice and is administered once every day, and successive administration 12 days is all given and gavage by 0.25ml/10g.Experiment finishes fasting in morning in first 1 day and can't help water.

2.4 leukocyte counts

In last administration, after 24 hours, mice is plucked eyeball and gets blood, with blood counting chamber, counts peripheral white blood cell.With the total white blood cells of 4 large grids of low power lens counting, then this number is multiplied by 50 under the microscope, obtains the leukocyte count of every cubic millimeter (1 microlitre).

2.5 statistical analysis

Data all adopt SPSS13.0 software to analyze, and measurement data adopts One-Way ANOVA variance analysis, uses LSD comparison between group, and result is with average ± standard deviation represent, with P<0.05 for there being statistical significance.

3. result

Result shows (in Table 3), compares with the mouse peripheral blood leukocyte count of Normal group, and model group significantly reduces, and there are differences obviously (P<0.01), shows modeling success.Compare with the mouse peripheral blood leukocyte count of model group; each administration group data all have notable difference with model group; there is significant difference (P<0.01) in modification yellow humic acid low dose group, middle dosage group and high dose group wherein; illustrate that modification yellow humic acid can increase mouse peripheral blood leukocyte count, mice 60Co x ray irradiation x is caused to bone marrow injury model good protective effect.

Table 3 is respectively organized mouse peripheral blood leukocyte count

Compare with model group, *p<0.05, *p<0.01; Compare #P<0.05 with positive control drug group.

## Patent Citations (1)

| Publication number | Priority date | Publication date | Assignee | Title |
|---|---|---|---|---|
| CN101475605A * | 2008-12-30 | 2009-07-08 | 华东理工大学 | Modification method of yellow humic acid, product obtained therefrom, and use thereof in preparation of immunity improving or HIV preventing medicaments |
| Family To Family Citations | | | | |

* Cited by examiner, † Cited by third party

## Non-Patent Citations (3)

| Title |
|---|
| 张覃沐等: "黄腐酸对小鼠免疫功能影响的实验研究",《河南医学院学报》 * |
| 杨慧珍: "浅谈黄腐酸钠在口腔科的应用",《黄腐酸》 * |
| 绍兴地区腐植酸治癌科研协作组: "应用腐植酸钠治癌的初步探讨(附典型病例介绍)",《浙江肿瘤通讯》 * |

* Cited by examiner, † Cited by third party

## Cited By (2)

| Publication number | Priority date | Publication date | Assignee | Title |
|---|---|---|---|---|
| CN105106235A * | 2015-08-18 | 2015-12-02 | 河南科技大学 | Sodium fulvate pharmaceutical composition, and sodium fulvate capsule preparation and preparation method thereof |
| CN113900164A * | 2021-04-13 | 2022-01-07 | 杭州安誉科技有限公司 | Optical lens, preparation method thereof and application thereof in branched optical fiber device |
| Family To Family Citations | | | | |

* Cited by examiner, † Cited by third party, ‡ Family to family citation

## Similar Documents

| Publication | Publication Date | Title |
|---|---|---|
| CN102153668B | 2013-09-11 | Anticancer Armillaria luteovirens polysaccharide and extraction process thereof |
| CN105816430A | 2016-08-03 | Preparation method of radix tetrastigme polysaccharide particle with antitumor function |
| CN101849999B | 2012-05-23 | Chinese medicinal composition for treating pelvic inflammation and preparation method thereof |
| CN101067006A | 2007-11-07 | Low molecular Brazil mushroom polysaccharide and its prepn process and application in antagonizing tumor metastasis |
| CN103720716A | 2014-04-16 | Application of modified fulvic acid in preparation of antitumor drugs |
| CN105125621A | 2015-12-09 | Oral composition with immunity enhancement function |
| CN101537011B | 2011-06-01 | Pharmaceutical composition for preventing or treating parkinsonism and preparation method thereof |
| CN102526568A | 2012-07-04 | Traditional Chinese medicine compound composition |
| CN104706729B | 2019-04-16 | A kind of Chinese medical extract and its extracting method and application with antitumor efficacy |
| CN101574388A | 2009-11-11 | Cordyceps oral solution and preparation method thereof |
| CN104069194A | 2014-10-01 | A traditional Chinese medicine composition having anticancer effects and a preparing method and uses thereof |
| CN102641325B | 2014-03-05 | Health care product having function of resisting fatigue and enhancing immunity and preparation method thereof |
| CN100566743C | 2009-12-09 | A kind of Chinese herbal medicine that suppresses tumor and preparation method thereof |
| CN105596890A | 2016-05-25 | Method for preparing traditional Chinese medicine composition for treating lung cancer |

| | | |
|---|---|---|
| CN103784492A | 2014-05-14 | Pratia begonafolia (Wall) Lindl. or P. nummularia (Lam.)A.Br.et Aschers extract with antitumor effect and application thereof |
| CN103720717A | 2014-04-16 | Application of modified fulvic acid in preparation of anti-arthritis medicament |
| CN101164558B | 2011-12-28 | Clot-dispersing pain-relieving medicinal composition and preparation method and application thereof |
| CN102727867A | 2012-10-17 | Antineoplastic pharmaceutical composition and application thereof, kit and package |
| CN1100550C | 2003-02-05 | Chinese medicine composition for curing various cancers |
| CN108853111B | 2020-06-05 | Application of composition in preparation of medicine for treating liver toxicity of gefitinib |
| CN101015680B | 2010-11-10 | Use of F-Glucoside peptide in preparing medicine for treating tumour |
| CN1277570C | 2006-10-04 | Pharmaceutical for treating alimentary tract ulcer disease and preparing process thereof |
| CN102068537B | 2015-12-02 | The preparation of Pericarpium Citri Reticulatae Radix Glycyrrhizae prevents and treats the health food of nasopharyngeal carcinoma and the production method of medicine |
| CN104547442B | 2017-07-28 | A kind of Chinese medicine composition with antitumor action |
| CN1053818C | 2000-06-28 | Ulcer powder |

## Priority And Related Applications

### Priority Applications (1)

| Application | Priority date | Filing date | Title |
|---|---|---|---|
| CN201310711250.1A | 2013-12-20 | 2013-12-20 | Application of modified fulvic acid in preparation of antitumor drugs |

### Applications Claiming Priority (1)

| Application | Filing date | Title |
|---|---|---|
| CN201310711250.1A | 2013-12-20 | Application of modified fulvic acid in preparation of antitumor drugs |

### Legal Events

| Date | Code | Title | Description |
|---|---|---|---|
| 2014-04-16 | C06 | Publication | |
| 2014-04-16 | PB01 | Publication | |
| 2014-05-14 | C10 | Entry into substantive examination | |
| 2014-05-14 | SE01 | Entry into force of request for substantive examination | |
| 2017-09-15 | RJ01 | Rejection of invention patent application after publication | |
| 2017-09-15 | RJ01 | Rejection of invention patent application after publication | **Application publication date**: 20140416 |

### Concepts

machine-extracted

Download Filter table

| Name | Image | Sections | Count | Query match |
|---|---|---|---|---|
| preparation method | | title,claims,abstract,description | 18 | 0.000 |
| antineoplastic agent | | title,claims,abstract,description | 17 | 0.000 |
| 3,7,8-trihydroxy-3-methyl-10-oxo-1,4-dihydropyrano[4,3-b]chromene-9-carboxylic acid | | title,abstract | 10 | 0.000 |
| drug | | claims,abstract,description | 38 | 0.000 |
| Kojic acid | | claims,abstract,description | 36 | 0.000 |
| kojic acid | | claims,abstract,description | 18 | 0.000 |
| degradation product | | claims,abstract,description | 15 | 0.000 |
| peat | | claims,abstract,description | 15 | 0.000 |
| water | | claims,abstract,description | 10 | 0.000 |
| raw material | | claims,abstract,description | 9 | 0.000 |

| | | | |
|---|---|---|---|
| chemical reaction | claims,abstract,description | 7 | 0.000 |
| humic acid | claims,description | 85 | 0.000 |
| modification | claims,description | 47 | 0.000 |
| modification reaction | claims,description | 47 | 0.000 |
| Cyclophosphamide | claims,description | 16 | 0.000 |
| Cyclophosphamide | claims,description | 16 | 0.000 |
| chemical substances by application | claims,description | 12 | 0.000 |
| degradation reaction | claims,description | 12 | 0.000 |
| catabolic process | claims,description | 11 | 0.000 |
| degradation | claims,description | 11 | 0.000 |
| organs | claims,description | 11 | 0.000 |
| carbon | claims,description | 7 | 0.000 |
| anti-tumor | claims,description | 5 | 0.000 |
| dosage form | claims,description | 5 | 0.000 |
| coal | claims,description | 4 | 0.000 |
| lignite | claims,description | 4 | 0.000 |
| effects | abstract,description | 15 | 0.000 |
| drugs | abstract,description | 10 | 0.000 |
| protecting | abstract,description | 2 | 0.000 |
| fulvic acid | abstract | 4 | 0.000 |
| fulvic acid | abstract | 4 | 0.000 |
| Sulfuric acid | abstract | 1 | 0.000 |
| degrading | abstract | 1 | 0.000 |
| nitric acid | abstract | 1 | 0.000 |
| side reaction | abstract | 1 | 0.000 |
| sulphuric acid | abstract | 1 | 0.000 |

Show all concepts from the description section